Claim Amendments

Amend the claims as follows:

1. (previously presented) A programmable controller for controlling an output state based on position indicated from a position transducer, comprising:

an interface to the position transducer that converts the transducer signals into a change in position;

a transducer position counter that accumulates the change in transducer position;

a net forward position counter that accumulates the net forward position;

means for comparing the value of the net forward position counter and the value of the transducer position counter;

means for updating the transducer position counter when the transducer signals indicate a change of position; and

means for updating the net forward position counter when the value of the net forward position counter and the value of the transducer position counter are equal and the transducer interface indicates a forward movement.

2. (original) The programmable controller of claim 1, further comprising means for disabling an output state when the transducer position does not match the net forward position.

3. (original) The programmable controller of claim 1, in which the transducer interface further converts the transducer signals into an index signal that occurs once per cycle in a repetitive operation cycle.

4. (original) The programmable controller of claim 3, further comprising means for setting the transducer position counter and the net forward position counter to zero when the index signal is detected and the transducer interface indicates a forward movement.

5. (original) The programmable controller of claim 4, further comprising means for setting a maximum position value, and comparison means for comparing the transducer position to the maximum position value.

6. (original) The programmable controller of claim 5, further comprising means for setting the transducer position counter to the maximum position value when the transducer position is zero and the transducer interface indicates a reverse movement.

7. (original) The programmable controller of claim 1, further comprising means for setting a maximum position value, and comparison means for comparing the transducer position to the maximum position value.

8. (original) The programmable controller of claim 7, further comprising means for setting the transducer position counter and the net forward position counter to zero when the transducer position is equal to the maximum position value and the transducer interface indicates a forward movement.

9. (original) The programmable controller of claim 8, further comprising means for setting the transducer position counter to the maximum position value when the transducer position is zero and the transducer interface indicates a reverse movement.

10. (currently amended) A programmable controller for controlling an output state based on position indicated from a position transducer, comprising:

an interface to the position transducer that converts the position transducer signals into a change in position;

a storage means for storing the position indicated from the position transducer ~~position~~;

a storage means for storing the net forward position;

comparison means for comparing the stored value of the net forward position and the stored value of the position indicated from the position transducer ~~position~~;

logic means for adding or subtracting the change in position to or from the position indicated from the position transducer ~~position~~;

logic means for updating the storage means of the position indicated from the position transducer ~~position~~ with the result of the addition or subtraction; and

logic means for updating the storage means of the net forward position with the result of the addition when the stored value of the net forward position and the stored value of the position indicated from the position transducer ~~position~~ are equal and the transducer interface indicates a forward movement.

11. (original) The programmable controller of claim 10, in which the transducer interface further converts the transducer signals into an index signal that occurs once per cycle in a repetitive operation cycle.

12. (original) The programmable controller of claim 11, further comprising means for setting the transducer position storage means and the net forward position storage means to zero when the index signal is detected and the transducer interface indicates a forward movement.

13. (currently amended) The programmable controller of claim 10, further comprising means for setting a maximum position value, and means for comparing the position indicated from the position transducer ~~position~~ to the maximum position value.

14. (currently amended) The programmable controller of claim 13, further comprising means for setting the transducer position storage means and the net forward position storage means to zero when the position indicated from the position transducer ~~position~~ is equal to the maximum position value and the transducer interface indicates a forward movement.

15. (currently amended) The programmable controller of claim 14, further comprising means for setting the transducer position storage means to the maximum position value when the position indicated from the position transducer ~~position~~ is zero and the transducer interface indicates a reverse movement.

16. (currently amended) A programmable controller ~~having a processor~~, comprising means for controlling an output state based on position indicated from a position transducer, and means for signaling the occurrence of an event to an external device ~~an internal interrupt to the processor~~ based on position indicated from the position transducer.

17. (canceled)

18. (currently amended) A programmable controller having a programmable processor, the controller for controlling an output state based on position indicated from a position transducer, comprising:

an interface to the position transducer that converts the transducer signals into a change in position;

means for accumulating the changes in position and storing the resulting position indicated from the position transducer ~~position~~;

means for storing a selected position value;

means for comparing the selected position value with the stored position indicated from the position transducer ~~position~~; and

means, responsive to the means for comparing, for signaling the programmable processor when the selected position value is equal to the position indicated from the position transducer ~~position~~.

19. (previously presented) The programmable controller of claim 18, further comprising:

means for storing a selected event value; and

the programmable processor comprising means for reading the selected event value.

20. (original) The programmable controller of claim 18, further comprising means for reloading a new selected position value after the selected position value and the transducer value are equal and the programmable processor has been signaled.

21. (currently amended) A programmable controller for controlling an output state based on position indicated from a position transducer, comprising:

an interface to the position transducer that converts the transducer signals into a change in position;

a counter that accumulates the change in transducer position;

means for updating the counter when the transducer signals indicate a change of position;

means for storing a selected position value;

means for comparing the selected position value with the stored position indicated from the position transducer ~~position~~;

delay means for creating a time delay;

means for storing the value of the time delay,

means for loading the value of the time delay with a specified delay and beginning the delay when the selected position value matches the position indicated from the position transducer ~~position~~;

means for changing the output value when the selected position matches the stored position indicated from the position transducer ~~position~~; and

means for changing the output value when the time delay completes.

22. (currently amended) The programmable controller of claim 21, further comprising

means for storing two output values; and

means for outputting the first output value when the selected position matches the stored position indicated from the position transducer ~~position~~, and for outputting the second output value when the time delay completes.

23. (original) The programmable controller of claim 21, further comprising a timer and an output value pair for each output of the controller.

24. (previously presented) A programmable controller for controlling an output state based on position indicated from a position transducer, comprising:

an interface to the position transducer;

a master-position counter;

one or more offset-position counters;

means for defining a maximum position value;

means for indicating when the master-position counter has reached the maximum position value;

means for storing one offset value for each offset-position counter; and

means for loading the stored offset value of each offset-position counter when the master-position counter has reached its maximum value.

25. (previously presented) The programmable controller of claim 24, further comprising:

means for indicating the next setpoint position to change the output;

means for comparing the value in the master-position counter or one of the offset-position counters with the value of the setpoint position and indicating a match if the two values are equal;

means for indicating a next-output value to be set when a match occurs; and

an output driver for producing an output state from the next output value when the match occurs.

26. (previously presented) A programmable controller for controlling an output state during a repetitive operation cycle using generated output signals, comprising:

a hardware timer for measuring the period of the repetitive operation cycle;

means for specifying a maximum cycle value; and

compare logic for disabling the output signals when the measured period is greater than the maximum cycle value.

27. (original) The programmable controller of claim 26, further comprising means for specifying a minimum cycle value, wherein the compare logic disables the outputs when the measured period is greater than the maximum cycle value or less than the minimum cycle value.

28. (currently amended) A programmable controller for controlling an output state based on position indicated from a position transducer, comprising:

an interface to the position transducer that converts the transducer signals into a change in position;

a counter that accumulates the change in transducer position;

means for updating the counter when the transducer signals indicate a change of position;

means for storing a selected position value;

means for comparing the selected position value with the stored position indicated from the position transducer ~~position~~;

delay means for creating a positional delay based on change in position;

means for storing the value of the positional delay,

means for loading the value of the positional delay with a specified delay and beginning the delay when the selected position value matches the position indicated from the position transducer ~~position~~.

29. (currently amended) The programmable controller of claim 28, further comprising means for changing the output value when the selected position matches the stored position indicated from the position transducer ~~position~~, and means for changing the output value when the position delay completes.

30. (currently amended) The programmable controller of claim 28, further comprising

means for storing two output values; and

means for outputting the first output value when the selected position matches the stored position indicated from the position transducer ~~position~~, and for outputting the second output value when the time delay completes.

31. (new) The programmable controller of claim 16, wherein the event signal comprises an interrupt.